The day had been close, hot, and breezeless, so far as the surface was concerned, and the cloud in question formed a grateful screen to the afternoon's sun, which was shining brightly north and south of our position; and continued to do so until old Sol hid his face for the night in lower clouds later on. At about 5 p.m., a well-formed waterspout was observed trailing away north-eastward from the cloud's northern verge; then about 40° or 30° high. Near the dense cloud from which it grew its mass was dark and opaque; but from half way down its length to below where it terminated in an unfinished turmoil of jags and rags, it was semi-transparent, the clouds beyond in the background being distinctly seen through it; and there was a light-coloured tube within its gauzy mass which at times was very pronounced and conspicuous.

There seemed to be no commotion on the river or the shore, over which its lower part hung at a height of five or six hundred feet, from the time when it was first observed until it began to wane and draw itself upwards. It was then, when it had shrunk and shortened, that the inside downrush was seen to advantage, and the simultaneous upward whirl around the dense remains of the tube, which, so far as I was able to make out from the motions of the cloudlets, I cannot do better than liken to the turning inside out of a coat sleeve or of a stocking, only the end of the tube was always ragged; and here, where this reversing process was taking place, there was great commotion in the air currents, more especially after the tube had withdrawn itself up to its opaque head.

I had a good telescope, observed these phenomena very carefully, and was on the alert for optical illusions; and, as the upper part of the spout remained intact for a long time after the gossamer-like lower continuation had melted into invisible vapour, I had an opportunity of studying it well.

It was very remarkable to see two or three common kites hovering high up in the vapour plane round and round the dense tube, every now and then becoming hidden behind it as they performed their gyrations, and in the same direction as the ragged fragments of rack or scud which were rushing round and upwards towards the dense head of the spout, until they were actually lost to sight in the very cloud itself.

The "thunder-headed" cloud, from the lower part of which the spout issued, gradually melted away, and grew less gaudy as it dwindled, without, as is usual under similar circumstances, pouring forth a torrent of rain. But there was a double rainbow projected on the clouds banking up over to the eastward, and evidently rain was falling in the space between them and the sun for some time after the last remains of the spout had disappeared, and all was again tranquil aloft.

The following evening, during a heavy thunderstorm and severe squall from the north-east, some twenty miles further down the river, a flash of lightning revealed the existence of a grand waterspout close by. This thunderstorm was remarkable, as it stretched south and north from the pilot station to far north of our position off Kedgeree, and struck both places at nearly the same hour, 7 p.m. Possibly all these phenomena had some connection with the small whirl reported in Mr. Pedler's useful weather bulletin issued daily from the Meteorological Office. The squall itself was seen from an early hour in the evening as a tract of dark streaks hovering eminently high up behind the accumulating white clouds away in the north-east and east, and threatening to quench the light north-west wind blowing in the estuary.

Subsequent information concerning this sudden thunderstorm shows that it was one of the class, referred to lately in NATURE by the Hon. Ralph Abercromby, which extend in an almost straight line for maybe hundreds of miles. It was felt at nearly the same hour all the way from Titighur on the north, to a point forty or fifty miles south of the Hughli Pilot Station—or, say, nearly 200 miles.

S. R. ELSON.

SCIENTIFIC SERIALS.

Journal of the Russian Chemical and Physical Society, vol. xx. fasc. 8.—On the properties of allene, by G. Gustavson and N. Demianoff. The existence of this isomer of allylene ($CH_2 : C : CH_2$) was foreseen since 1872; now, it has been obtained by the action of zinc dust and alcohol on $C_3H_4Br_2$. It is an uncoloured gas, the smell of which resembles that of allylene. It smokes freely when burning.—A note on the atomicity of bore, by G. Gustavson.—On unorganized ferments, by N. Kravkoff, being an inquiry into the properties of pure vegetable diastase.—On a general law of contraction during the formation of solutions of salts, by A. Geritsch. The author comes to the conclusion that the contraction (δ) is proportional to the produce of the respective percentages of water and salt in the solution $\delta = C(100 - p)p$; for Na_2CO_3 the constant C is $= 0{\cdot}0086$, and the contraction calculated by means of the formula for solutions at from 3 to 13 per cent. are very near the contractions directly measured by Gerlach and Mendelejeff.—On the solutions of sulphuric acid from the molecular point of view, by M. Teploff.—On the heat of combustion of stilbene, the mononaphthenes, and some organic acids, by J. Ossipoff.—An apparatus for the demonstration of thermic conductibility, by O. Chwolson.—On a new method of measuring the index of refraction, used by E. Forsch for measuring the same in the lenses of the Pulkowa refractor.—A note on the mutual influence of electrized bodies, by A. Stepanoff.

SOCIETIES AND ACADEMIES.

LONDON.

Linnean Society, January 17.—Mr. W. Carruthers, F.R.S., President, in the chair.—On behalf of M. Buysman, of Middleburg, Mr. B. D. Jackson exhibited a series of careful dissections of *Nymphœa cœrulea* collected by Dr. Schweinfurth in Egypt.—Mr. D. Morris exhibited specimens of drift fruit from Jamaica, where he had collected no fewer than thirty-five different kinds brought by the Gulf Stream from the mouths of the Orinoco and Amazon. Although the species exhibited had not been determined with certainty, it was believed to be probably *Humiria balsamifera*, Aud., the flower of which is figured by Eichler ("Flora Brasiliensis," vol. xii. part 2, p. 440, pl. xcii. fig. 1), but the fruit undescribed. It was commonly known in French Guiana as *bois rouge*, and from it was obtained a gum used medicinally and burnt as incense. An interesting discussion followed, in which Mr. J. G. Baker, Mr. Rolfe, and Mr. Breese took part.—Mr. T. Christy exhibited a material felted from Manilla hemp, and waterproofed, very strong and light, and particularly useful for surgical bandages, for which purpose it was highly recommended by army surgeons.—Mr. F. Crisp exhibited some specimens of agate so curiously marked as to lead to the erroneous supposition that they inclosed fossil insects and Crustacea.—A paper was then read, by Mr. J. G. Tepper, on the natural history of the Kangaroo Island grass-tree, *Xantharrhœa Tateana*. This tree grows abundantly in Kangaroo Island, South Australia, in poor gravelly and sandy soil, intermixed with ferruginous concretions, and attains a height of from 6 to 14 feet, with a diameter of 6 to 18 inches, and a floral spike of from 10 to 19 feet. It is thus a most conspicuous plant, and lends a peculiarly weird aspect to the country it occupies. Its rate of growth is described as very slow, old settlers having remarked but little change in individual trees after thirty years' observation. The most remarkable feature in the structure of the stem is the formation of a dense ligneous central core immediately above and connected with the roots, exhibiting numerous annular zones traversed by transverse (medullary) fibres. The flowers are borne in a dense spike upon a smooth peduncle. Individually they are inconspicuous, of a whitish colour, and develop a strong odour and abundant nectar during the warmer part of the day, when they are visited and fertilized by Hymenopterous insects, the most remarkable being a large metallic-green carpenter-bee (*Xylocapa*), which tunnels out cells in the dead flower-stalks. An interesting discussion followed upon the botanical position of the grass-trees, and the antiquity of the type, in which the President, Mr. A. W. Bennett, Mr. J. G. Baker, Mr. Morris, and Mr. Rolfe took part.

EDINBURGH.

Royal Society, December 17, 1888.—Sir W. Thomson, President, in the chair.—Mr. R. Kidston read a paper on some fossil plants from Teilia quarry, Gwaunyscor, near Prestatyn, Flintshire.—Dr. G. Sims Woodhead communicated an abstract of the results of an inquiry into the causation of Asiatic cholera. The first part (general) was by Dr. Neil McLeod and Mr. W. T. Milles. The second part (with special regard to the reproduction of the disease) was by Dr. McLeod. The disease was shown to be due to the comma bacillus. In forty out of forty-four cases this bacillus was present; while, in a large number of spurious cases, it was only once or twice detected. It was found that symptoms similar to those accompanying cholera in man followed injection of the comma bacillus into the stomach of the guinea-pig, care being taken to neutralize the acid products which are fatal to the organism.—Prof. Tait described some preliminary observations with a large rotatory-polarization spectroscope. In this apparatus the light passes through a slit and collimator, a Nicol's prism, a train of cylinders of quartz, a double-image prism, and an ordinary direct-vision spectroscope. The instrument is so arranged that the two spectra produced are in exact juxtaposition side by side, each spectrum being alternately crossed by dark interference bands corresponding to successive rotations of the plane of polarization through 180°. A scale is thus applied to the spectrum, and the interval between successive bands can be subdivided to any required degree of accuracy. Wave-length is thus measured with extreme accuracy by the amount of rotation of the plane of polarization. When the apparatus is used, not with bright-line spectra but, with continuous spectra, the excessive loss of intensity by dispersion which occurs in ordinary spectrometers may be avoided.—Dr. Woodhead communicated a paper by Mr. G. Brook, entitled "Preliminary Remarks on the Homologies of the Mesenteries in Antipatharia and other Anthozoa." After describing the arrangement and musculature in the common shore anemone, *Edwardsia*, Cerianthidæ, in Alcyonaria, Madreporaria, Mr. Brook pointed out that the Antipatharia are generally supposed to be degenerate forms, and to have lost a considerable number of the mesenteries that were present in their ancestors. Mr. Brook, who is examining the *Challenger* collection of Antipatharia, has been able to make sections of twenty-three species, from which he finds that the arrangement, number, and relative development of the mesenteries cannot be explained in accordance with the views current on the subject. With the exception of two pairs of directives the mesenteries do not appear to show the paired arrangement usually looked for. He gives the arrangement of the mesenteries in *Cladopathes* (six mesenteries), *Antipathes* (ten mesenteries), *Leiopathes* (twelve mesenteries), and points out that the arrangement in these forms receives its explanation by a comparison with the order in which the first twelve mesenteries are, according to Lacaze-Duthiers, developed in Hexactiniæ. In *Actinia* and *Sagartia* the first twelve mesenteries are developed in pairs which are not adjoining mesenteries, but are situated one on each side of the stomodæum. The order in which they are developed in *Sagartia bellis* (and in *Actinia equina*?) precisely corresponds *with their relative length* in *Leiopathes*. The first pair to be developed are those corresponding to the transverse mesenteries in Antipathidæ; next follow the two pairs of directives, and afterwards the three pairs which he has termed "secondary" in Antipathidæ. The shortest mesenteries in *Leiopathes* are the last of the six pairs to be developed in *Sagartia*. Evidently, then, the mesenteries forming a pair are originally opposite mesenteries and not adjacent ones. We thus have, in forms with an elongated stomodæum, a true bilateral symmetry. The two pairs of directives limit an anterior and a posterior unpaired chamber. Between these two the cœlenteron may be imperfectly divided into any number of paired lateral chambers. On this interpretation the arrangement in Alcyonaria, *Edwardsia*, Cerianthidæ, *Madracis*, &c., is also easily understood: all are modifications of one plan. In the Hexactiniæ the simple bilateralism is masked, but a careful study of the order in which the mesenteries are developed shows clearly how this is brought about. In all types the mesenteries of a pair are originally on opposite sides of the stomodæum. The two pairs of "directives" come to be *adjacent* mesenteries, for the reason that no new mesenteries are ever formed between them, and with a further development of mesenteries they come to be pushed closer together. As is clearly seen from Hertwig's figures of the embryonic condition in *Peachia*, the other so-called "pairs" of primary mesenteries are not pairs developmentally, as they consist of mesenteries of different ages. They are called pairs because they are arranged in couples, having the retractor muscles on their inner surfaces. In Hexactiniæ the further increase in the number of mesenteries takes place in a modified way. Buds appear which are on opposite sides of the stomodæum between existing "pairs," but, instead of giving rise to a single mesentery as before, each gives rise to two, with the retractor muscles on their inner surfaces. The general plan of development Mr. Brook considers to be as follows: The mesenteries have a radiate arrangement in forms with a round stomodæum; this arrangement becomes bilateral by an elongation of the stomodæum in one axis—the sagittal. In this case the anterior and posterior pairs (directives) come to consist of adjoining mesenteries, whilst the intermediate pairs consist of opposite mesenteries. So long as the folds of the body-wall give rise to only one mesentery each, the simple bilateral arrangement is retained, as in Cerianthidæ (this refers to bilateral arrangement of parts, irrespective of the outline of the polyp). In case the mesenterial rudiments give rise (after the formation of the first twelve mesenteries) to two mesenteries instead of one, the Hexactinian type is reached. In certain Madreporaria (*e.g. Lophohelia*, *Mussa*, and *Euphyllia*) the radiate arrangement appears never to be lost. At any rate, according to Fowler and Bourne, there are no mesenteries distinguishable from the others as "directives," and there is a perfectly radiate symmetry. Such a general plan of development is also found in *Peripatus* and in Vertebrata. In *Peripatus* the blastopore becomes elongated and closes in the centre, but its two extremities remain open as the mouth and anus. The mesoblastic somites are formed in the region in which the blastopore has closed, and these become more numerous as the two extremities become more and more separated. At present, Mr. Brook is only able to indicate the bearing of these views in outline. He hopes, however, shortly to make a more detailed communication on the subject.

January 7.—Prof. Chrystal, Vice-President, in the chair.—At the request of the Council of the Society, Prof. Tait gave an address on the compressibility of water, salt-solutions, glass, and mercury. His address was illustrated by experiments.

PARIS.

Academy of Sciences, January 21.—M. Des Cloizeaux, President, in the chair.—On a point in the question of homogeneous elastic plaques, by M. H. Resal. In this note the author proposes to base the hypothesis relative to the expressions of the tangential dilatations on a supposition of a more general character than that hitherto assumed by geometricians.—On the Hæmatozoa detected by M. Laveran in the blood of the inhabitants of marshy districts, by M. Bouchard. Attention is called to the great importance of the discovery made by M. Laveran ten years ago, and now placed beyond all doubt, that marsh fevers are of parasitic character. They offer the first known example in man of an animal parasitism in which the pathogenic agent appears to be placed at the lowest scale of animal life. While most infectious maladies in man and animals are due to vegetable microbism, the most important and widespread infectious disease in man is now shown to depend on animal microbism. The parasite observed by M. Laveran in Algeria has since been found in France, Corsica, Italy, Russia, Madagascar, Tonquin, and America, and is identical with the organism more recently detected by Marchiafava and Celli in the blood of people inhabiting marshy districts.—On the elementary terms in the co-ordinates of a planet, by M. Hugo Gyldén. Supplementing his recent communication on this subject, the author here points out that, the convergence of the terms in question being established, their numerical values may be determined by the methods proposed in the paper on the determination of the radius vector in the absolute orbits of the planets inserted in the *Monthly Notices* of the Royal Astronomical Society, London.—On the distribution of the aqueous vapour in the atmosphere, by M. A. Crova. In a previous note (*Comptes rendus*, cviii. p. 35) MM. Crova and Houdaille communicated the results of the observations made last August at Bedoin and on the summit of Mont Ventoux. From those results M. Crova here deduces the mode of distribution of the aqueous vapours at various altitudes. Although only approximate, the calculations show how rapidly the quantity of vapour must decrease with the increase of altitude. The quantity itself also varies greatly from day to day, which is again explained by the fact that the vapours are mainly confined to the lower atmospheric regions, which are most directly influenced by meteorological phenomena.—Note on the new meridian of France, communicated by the Minister of War. The Geodetic Section of the Service Géographique de l'Armée concluded in 1888 the measurement of the angles for the new meridian begun eighteen years ago. The present note embodies a summary report of the main results, from which it appears that the meridian of Delambre and Méchain, useful in their day, can no longer serve as a base for the triangulation of France, or for further researches on the form of the globe. For these purposes the new meridian offers all the necessary elements except for the south-west region, where fresh measurements are required to secure complete accuracy.—Observation relative to M. Vaschy's recent note on the propagation of the current in a telegraph line, by M. L. Weiller. The author questions on theoretical grounds some of M. Vaschy's conclusions, on which has been based an application for a patent. M. Weiller submits a specimen of a telephonic cable with two conductors constructed for the purpose of obtaining by self-induction the compensation of the electro-static capacity. In this apparatus the increase of the coefficient of self-induction is obtained by inclosing the chief copper conductor in a covering of soft iron wire.—Observations of the partial lunar eclipse of January 16, 1889, made at the Observatory of Lyons, by M. G. Le Cadet; and at the Paris Observatory, by MM. D. Eginitis and Maturana. The observations at Lyons were made with the Gautier equatorial *coudé*, and at Paris with the west equatorial in the garden. In the latter place the atmospheric conditions were favourable at the commencement and towards the close of the eclipse; but during the middle period the sky became overcast, preventing the complete observation of all the phases.—Experimental verification of M. Charles Soret's method for measuring the indices of refraction in crystals with two axes, by M. Louis Perrot. In a previous note (*Comptes rendus*, cvii. p. 176), M. Soret showed that the three chief indices of refraction in a crystal with double axis may be deduced from the limiting angles of total reflection on any given faces. M. Perrot has now verified this method by experiments with ordinary tartaric acid, employing a Liebisch refractometer for the purpose.—On the electric conductibility of salts in solution, by M. Lucien Poincaré. The author finds that the high polarization of a silver electrode plunged into a saline solution, such as the nitrate of potassa, falls immediately to zero by adding a trace of the nitrate of silver. From this phenomenon follows a means of greatly simplifying in certain cases the method hitherto employed by MM. Bouty and Poincaré for measuring the electric resistances of saline solutions.—Papers were contributed by M. Ch. Antoine, on the expansion and compression of atmospheric air; by MM. C. Vincent and Delachanal, on the extraction of sorbite; by M. J. Meunier, on the dibenzoic acetal of sorbite; by M. A. de Lapparent, on the relation of the acid eruptive rocks to the phenomenon of the solfataras; and by M. H. Morize, on the Widmanstätten figures, illustrated by two photographs obtained in direct and diffused light.

BERLIN.

Physical Society, December 28.—Prof. Kundt, President, in the chair.—Dr. Ritter demonstrated, with the help of an electric arc-lamp, the action of the ultra-violet rays on the electrical discharge at the negative pole.—Dr. Lummer spoke on photometers, and deduced, from the experiences gained with the existing instruments, the following as requirements in their construction: in the first place, the surfaces whose brightness of illumination is to be equalized must not be separated by even the narrowest intervening space; and in the second, the outline of the surfaces must be sharply defined. The first of the above requirements is satisfied in Bunsen's grease-spot photometer, but not the second. A further drawback arises from the fact that the grease-spot reflects light, and the paper allows some to pass through, so that both the spot and the surrounding surface are always illuminated by both sources of light. An ideally perfect photometer ought to reflect no light from its grease-spot, and be impermeable to light over the rest of its surface. The speaker, working in conjunction with Dr. Brodhun, had obtained the above desiderata by purely optical means. When two total-reflection prisms are placed with their hypotenuse surfaces in juxtaposition, and two of the surfaces of the glass-cube thus formed are illuminated by light from bright surfaces, then on looking through the combination of prisms the only light which reaches the eye will be that which enters laterally, whereas that which enters from the opposite side cannot reach the eye. When a drop of Canada-balsam, whose refractive index is very nearly the same as that of the glass, is placed between the opposed hypotenuse surfaces, total reflection is done away with at the place where the drop lies, and thus by illumination from *one* side only either a bright spot is seen on a dark ground or a dark spot on a bright ground. When the illumination is made from *both* sides, equality of illumination can be easily established by adjusting the relative distances of the sources of light until the spot disappears entirely. The drop of Canada-balsam very soon loses its sharply-defined edges, hence some other mode of procedure became necessary. The central portion of the hypotenuse surface of one of the total-reflection prisms was left untouched, while the rest of the surface was ground to a slightly spherical shape. When the surfaces of the prisms were now firmly pressed together, light passed without hindrance across the point of close contact of the surfaces, whereas it was totally reflected at all other points. By this means an ideally perfect "grease-spot" was obtained, which was permeable to light, but reflected none, while the surrounding area reflected light completely and allowed none to pass through. A third method for obtaining an ideally perfect grease-spot consisted in etching figures on one of the reflecting surfaces of the prisms; the etched portions were perfectly transparent, the rest of the surface reflected light completely. The speaker exhibited photometers constructed according to the above methods, and proved theoretically that the ideally perfect grease-spot bears to the real one the ratio of 1 to 2, according to the constants determined in the Imperial Physico-Technical Institute. The sensitiveness of the new photometer is about 1 per cent.

BOOKS, PAMPHLETS, and SERIALS RECEIVED

Realistic Elementary Geography: W. G. Baker (Blackie).—Elementary Inorganic Chemistry: A. H. Sexton (Blackie).—Insect Life, vol. i. No. 6 (Washington).—Mineral Statistics of Victoria, 1887.—Report of the Secretary for Mines (Melbourne).—Les Levers Photographiques et la Photographie en Voyage: Dr. G. Le Bon (Paris, Gauthier-Villars).—Annuaire pour l'an 1889, par le Bureau des Longitudes (Paris, Gauthier-Villars).—A Text-book of Human Physiology, 4th ed.: Dr. A. Flint (Lewis).—Manuel Pratique de Cristallographie: G. Wyrouboff (Paris, Gauthier-Villars).—An Illustrated Manual of British Birds, Parts 8, 9, 10: H. Saunders (Gurney and Jackson).—Annali di Agricultura, 1888: Prof. Giglioli (Rome, Rotta).—The Assistant to the Board of Trade Examinations: Captain Forbes (Relfe).—State Museum of Natural History, Albany, N.Y., 41st Annual Report (Troy).—A Text-book of General Astronomy: Dr. C. A. Young (Ginn).—La Legge del Diretto in Rispetto alle varie leggi di Natura: Prof. G. A. Longo (Catania, Martinez).—New Commercial Plants and Drugs, No. 11: T. Christy (Christy).—A Bibliography of Indian Geology: R. D. Oldham (Calcutta).—Report of the Commissioners on Inland Fisheries and Game for Year ending December 31, 1888 (Boston).—Journal of the Royal Statistical Society, December (Stanford).—Archives Italiennes de Biologie, Tome xi. Fasc. 1 (Turin, Loescher).—Himmel und Erde, Heft 5 (Berlin, Paetel).—Beiblätter zu den Annalen der Physik und Chemie, 1888, No. 12 (Leipzig, Barth).

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